REMARKS

Claims 1-5, 7-21, 23, and 24 are pending in this application. Claims 6 and 22 have been canceled. Claims 1 and 19 are independent.

Art Rejections

Claims 1, 7, 8, 10, 11, 13, 16, 19 and 23 are rejected under 35 U.S.C. § 102(b) as being unpatentable over Shima (USP 6,055,094) Claims 2-5, 20, and 21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shima in view of Yang. Claims 6 and 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shima in view of Taylor. Claims 9 and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shima in view of Alexander. Claim 14 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Shima. Claims 1, 15, 17, 19, and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Becker in view of Shima. Claim 18 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Taylor in view of Shima.

These rejections, insofar as they pertain to the presently pending claims, are respectfully traversed.

Applicants have amended independent claims 1 and 19 to include the features of claims 6 and 22, respectively. This

amendment renders almost all of the prior art rejections moot. The remaining rejection is under 35 U.S.C. § 103(a) and applies a combination of Shima and Taylor to reject the features of claims 6 and 22 (now part of claims 1 and 19).

This remaining rejection has been clearly overcome by the filing of a terminal disclaimer as to Taylor. The filing of a terminal disclaimer establishes common ownership between Taylor and this patent application at the time of invention. Thus, Taylor has been disqualified as prior art under 103(c). Therefore, all of the prior art rejections have been clearly overcome and applicants respectfully request reconsideration and withdrawal thereof.

Obvious Double Patenting Rejection

Claim 18 is rejected under the judicially created doctrine of obviousness-type double patenting over claim 1 of Taylor (USP 6,057,959) in view of Shima (USP 6,055,094). This rejection, insofar as it pertains to the presently pending claims, is respectfully traversed.

The terminal disclaimer filed concurrently with this response clearly overcomes the obvious double patenting

rejection. Therefore, applicants respectfully request reconsideration and withdrawal thereof.

Conclusion

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Michael R. Cammarata (Reg. No. 39,491) at the telephone number indicated below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Applicants hereby petition for a three (3) month extension of time for filing this Reply. Attached, please find a check in the amount of $930.00 for the large entity three (3) month extension fee. If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 50-0308 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

By______________________

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims of the invention has been amended as follows:

1. (Amended) An optical amplification device, comprising:

a first segment of active optical fiber having a first end portion coupled to an optical communication path carrying a plurality of optical signals, each at a respective one of a plurality of wavelengths, and a second end portion, said first segment of active optical fiber receiving the plurality of optical signals through the first end portion and outputting the plurality of optical signals through the second end portion;

a dispersion compensating element optically coupled to the second end portion of said first segment of active optical fiber;

a second segment of active optical fiber having a first end portion coupled to said dispersion compensating element and carrying a plurality of dispersion compensated optical signals, each at a respective one of a plurality of wavelengths, and a second end portion, said second segment of active optical fiber

receiving the plurality of optical signals through the first end portion and outputting the plurality of dispersion compensated optical signals through the second end portion;

a variable optical attenuator having an input port coupled to the second end portion of said second segment of optical fiber, said variable optical attenuator having a control port that receives an attenuation control signal and an output port, said input port of said variable optical attenuator receiving the plurality of dispersion compensated optical signals;

a third segment of active optical fiber having a first end portion coupled to the output port of said variable optical attenuator and a second end portion, the plurality of dispersion compensated optical signals propagating through said variable optical attenuator and being supplied to the first end portion of said third segment of active optical fiber via the output port of said variable optical attenuator, the plurality of dispersion compensated optical signals being output from said third segment of active optical fiber via the second end portion of said third segment of active optical fiber; and

a control circuit operatively coupled to the optical communication path, said control circuit sensing an input optical power of at least one of the plurality of optical signals input to the first end of said first segment of active

optical fiber and inputting a dispersion compensating element loss value representative of a power loss across said dispersion compensating element, said control circuit outputting the attenuation control signal in response to the input optical power and the dispersion compensating element loss value,

said variable optical attenuator attenuating the plurality of optical signals in response to the attenuation control signal such that a gain profile of the plurality of dispersion compensated optical signals output from the second end portion of said third segment of active optical fiber is flattened, said control circuit including:

an attenuator offset value storage device operatively connected to said control circuit, said attenuator offset value storage device storing an attenuator offset value;

said control circuit inputting the attenuator offset value from said attenuator offset value storage device and outputting the attenuation control signal in response to the input optical power, the dispersion compensating element loss value and the attenuator offset value.

2. (Amended) The optical amplification device in accordance with claim 1, said control circuit including:

a photodetector operatively coupled to the first end portion of said first segment of active optical fiber, said photodetector sensing the input optical power of at least one of the plurality of optical signals input to the first end of said first segment of active optical fiber and outputting an electrical signal in response thereto;

a memory device storing the dispersion compensating element loss value representative of a power loss across said dispersion compensating element;

a processing unit operatively coupled to said photodetector and to said memory device, said processing unit receiving the electrical signal from said photodetector and the dispersion compensating element loss value from said memory device; said processing unit outputting the attenuation control signal in response to the electrical signal<u>, the attenuator offset value,</u> and the dispersion compensating element loss value.

3. (Twice Amended) The optical amplification device in accordance with claim 1, said control circuit including:

a first photodetector operatively coupled to the first end portion of said first segment of active optical fiber, said

photodetector sensing the input optical power of at least one of the plurality of optical signals input to the first end of said first segment of active optical fiber and outputting an electrical signal in response thereto;

a second photodetector operatively coupled to an input port of said dispersion compensating element, said second photodetector sensing an optical input power associated with the plurality of optical signals input to said dispersion compensating element and outputting a second electrical signal in response thereto;

a third photodetector operatively coupled to an output port of said dispersion compensating element, said third photodetector sensing an optical output power associated with the plurality of dispersion compensated optical signals output from said dispersion compensating element and outputting a third electrical signal in response thereto;

a memory device storing a reference span loss value indicative of a span loss associated with a preceding span to which said first segment of active optical fiber is operatively connected and a reference dispersion compensating element loss value representative of a reference power loss across said dispersion compensating element;

a processing unit operatively coupled to said first, second and third photodetectors and to said memory device, said processing unit receiving the first, second and third electrical signals from said first, second, and third photodetectors and the reference span loss and dispersion compensating element loss values from said memory device; said processing unit outputting the attenuation control signal in response to the first electrical signal, the second electrical signal, the third electrical signal, the reference span loss value, the attenuator offset value, and the dispersion compensating element loss value.

4. (Amended) The optical amplification device in accordance with claim 1, said control circuit including:

a first photodetector operatively coupled to the first end portion of said first segment of active optical fiber, said photodetector sensing the input optical power of at least one of the plurality of optical signals input to the first end of said first segment of active optical fiber and outputting an electrical signal in response thereto;

a second photodetector operatively coupled to an input port of said variable optical attenuator, said second photodetector sensing an optical input power associated with the plurality of

optical signals input to said dispersion compensating element and outputting a second electrical signal in response thereto;

a third photodetector operatively coupled to an output port of said dispersion compensating element, said third photodetector sensing an optical output power associated with the plurality of dispersion compensated optical signals output from said dispersion compensating element and outputting a third electrical signal in response thereto;

a comparator operatively connected to said second and third photodetectors and receiving the second and third electrical signals, said comparator comparing the second and third electrical signals and generating the dispersion compensating element loss value in response thereto;

a memory device storing a reference span loss value indicative of a span loss associated with a preceding span to which said first segment of active optical fiber is operatively connected and a reference dispersion compensating element power loss value representative of a power loss across said dispersion compensating element;

a processing unit operatively coupled to said first photodetector, said comparator, and said memory device, said processing unit receiving the first electrical signal from said first photodetector; the dispersion element power loss value

from said comparator; and the reference span and dispersion element power loss values from said memory device; said processing unit outputting the attenuation control signal in response to the first electrical signal, the dispersion element power loss value; the reference span power loss value, the attenuator offset value, and the dispersion element power loss value.

5. (Amended) The optical amplification device in accordance with claim 1, said control circuit including:

a first photodetector operatively coupled to the first end portion of said first segment of active optical fiber, said photodetector sensing the input optical power of at least one of the plurality of optical signals input to the first end of said first segment of active optical fiber and outputting an electrical signal in response thereto;

a second photodetector operatively coupled to an input port of said variable optical attenuator, said second photodetector sensing an optical input power associated with the plurality of optical signals input to said dispersion compensating element and outputting a second electrical signal in response thereto;

a third photodetector operatively coupled to an output port of said dispersion compensating element, said third

photodetector sensing an optical output power associated with the plurality of dispersion compensated optical signals output from said dispersion compensating element and outputting a third electrical signal in response thereto;

a dispersion compensating element loss error calculator operatively connected to said second and third photodetectors and receiving the second and third electrical signals, said dispersion compensating element loss error calculator calculating a dispersion compensating element loss error based on the second and third electrical signals and a reference dispersion compensating element loss value;

a span loss error calculator operatively connected to said first photodetector and receiving the first electrical signal, said span loss error calculator calculating a span loss error based on the first electrical signal and a reference span loss value;

a processing unit operatively coupled to said dispersion compensating element loss error calculator and said span loss error calculator, said processing unit receiving the dispersion compensating element loss error and the span loss error; said processing unit outputting the attenuation control signal in response to the dispersion compensating element loss error, the attenuator offset value, and the span loss error.

~~6. The optical amplification device in accordance with claim 1, said control circuit including:~~

~~an attenuator offset value storage device operatively connected to said control circuit, said attenuator offset value storage device storing an attenuator offset value;~~

~~said control circuit inputting the attenuator offset value from said attenuator offset value storage device and outputting the attenuation control signal in response to the input optical power, the dispersion compensating element loss value and the attenuator offset value.~~

19. (Amended) A method of controlling an optical amplification device having a first, second and third amplification stages and connected to a span having a span loss that may vary, comprising:

a first amplifying step amplifying a plurality of optical signals each at a respective one of a plurality of wavelengths with the first amplification stage;

dispersion compensating the plurality of optical signals output from the first amplification stage;

a second amplifying step amplifying the plurality of dispersion compensated optical signals with the second amplification stage;

optically attenuating the dispersion compensated optical signals output from the second amplification stage;

a third amplifying step amplifying the optically attenuated signals with the third amplification stage;

sensing an input optical power of at least one of the plurality of optical signals input to the first amplification stage;

controlling said optically attenuating step to optically attenuate the dispersion compensated optical signals output from the second amplification stage according to the input optical power sensed by said sensing step and a dispersion compensating element loss value;

said optically attenuating step optically attenuating the plurality of dispersion compensated optical signals such that a gain profile of the plurality of dispersion compensated optical signals output from the third amplification stage is flattened; and

storing an attenuator offset value;

said controlling step controlling said optically attenuating step to optically attenuate the dispersion

compensated optical signals output from the second amplification stage according to the input optical power sensed by said sensing step, the dispersion compensating element loss value; and the attenuator offset value stored by said storing step.

~~22. The method of controlling an optical amplification device in accordance with claim 19, further comprising:~~

~~storing an attenuator offset value;~~

~~said controlling step controlling said optically attenuating step to optically attenuate the dispersion compensated optical signals output from the second amplification stage according to the input optical power sensed by said sensing step, the dispersion compensating element loss value; and the attenuator offset value stored by said storing step.~~